

Attachment 1

Indiana's technical comments on USEPA's Proposed Findings of Significant Contribution under Section 126 of the Clean Air Act

Background

USEPA proposes to rely on the conclusions it drew in the final NOx SIP call rulemaking to determine whether the emissions in the upwind States contribute significantly to the 1-hour and 8-hour nonattainment and maintenance problems in the petitioning Northeast States. Therefore, Indiana's modeling comments focus on the modeling performed in the NOx SIP call.

To evaluate the air quality impacts in the final NOx SIP call rulemaking, USEPA used a weight-of-evidence approach involving three sets of modeling information: the State-by-State UAM -V zero-out modeling, the CAMx source apportionment modeling, and the OTAG subregional modeling and other information such as emission density and transport distance. A number of metrics (i.e., measures of ozone contributions) were used to assess the air quality effects from several perspectives of contribution from sources in various upwind States. The metrics were designed to provide information on three factors for evaluating whether emissions in an upwind State contribute to nonattainment the Northeast States. The factors are (a) the magnitude of the contribution, (b) the frequency of the contribution and (c) the relative amount of the contribution.

The emissions scenarios include a 2007 Base Case and a control scenario designed to evaluate the effects of NOx controls on nonattainment in downwind states. The Base Case scenario accounts for growth in emissions and reductions associated with Clean Air Act mandated controls and additional Federal measures. This was done by taking the Base Year inventory (either 1995 or 1996), projecting it to 2007 and applying certain controls. In the control strategy scenario, NOx emissions from utility and non-utility sources were reduced by applying controls to all sources in the 23 states. For the purposes of evaluating air quality impacts, U.S. EPA modeled all of the episodes that were used by OTAG. The four OTAG episodes are: July 1-11, 1988, July 13-21, 1991, July 20-30, 1993, July 7-18, 1995.

Comments

Weight of Evidence Determination

Indiana does not agree that USEPA's technical work demonstrates that Indiana has a significant impact on the downwind states of New York, Pennsylvania, or Connecticut. Additional modeling, performed by the Lake Michigan Air Directors Consortium, should be included as part of the Weight of Evidence Determination. In the attachments, Figure 1 shows the extent of Grid M used in the LADCO modeling domain. In Figure 2 and Figure 3, Grid M is nested inside the OTAG domain. Two episodes are shown: June 22-28, 1991 and July 14-21, 1991. The color tile plots show the 1 hour benefits of the SIP call both in and outside Grid M when the OTAG domain implements only the 2007 CAA controls. As can be seen in both figures, emission reductions in a given area mostly affect ozone in that same area. Emissions reductions in a given area also affect ozone in downwind areas (i.e., there is transport), but ozone benefits decrease with distance. The impact of the proposed NOx SIP call throughout Grid M extends as far Western Pennsylvania, portions of Western New York and Ontario for the July 1991 episode. In the June 1991 episode, benefits occur in Ontario with little to none in the two aforementioned states. This modeling does not substantiate the Section 126 petitions' request because the benefits by invoking the NOx SIP call for areas within Grid M are minimal at best for the 126 petition states.

State-by-State zero-out modeling

Indiana does not agree with the use of zero-out modeling to quantify the contributions of emissions in upwind States on nonattainment downwind areas. USEPA performed zero-out modeling analysis which provided an estimate of downwind impacts by comparing the model predictions from a Base Case run to the predictions from a run in which the Base Case manmade emissions are removed from a specific State. This simplistic approach of zero-out modeling fails to recognize that emissions from one source region influence ozone formation by emissions from surrounding source regions. The changes in the chemical state of the atmosphere are altered thus defeating the purpose of doing “photochemical modeling”. Zero-out modeling poses impossible and unrealistic conditions that will never occur in the real world. Indiana does not agree with this technical representation to estimate ozone culpability.

Equations For UAM-V Metrics

The metrics used for the NOx SIP call are referenced in the Section 126 petitions found in Appendix B, Equations for UAM-V Metrics. The NOx SIP call states: This metric quantifies the total ppb contributed in the downwind area from an upwind State, **not including that portion of the contribution that occurs below the level of the NAAQS**. For 1-hour concentrations, Metric 3 is calculated by taking the difference between the Base Case predictions in each nonattainment receptor and either (a) the corresponding value in the zero-out run, or (b) 125 ppb, whichever is greater (i.e., 125 ppb or the prediction in the zero-out run). The Base Case vs zero-out differences are summed over all time periods (i.e. hourly or daily) and across all nonattainment receptors in the downwind area. The calculation of this metric is illustrated by the following example. If the Base Case 1-hour daily maximum ozone prediction is 150 ppb and the corresponding value from the zero-out run is 130 ppb, then the difference used in this metric is 20 ppb. However, if the value from the zero-out run is 115 ppb, then the difference used in this metric is 25 ppb (i.e., 150 ppb -125 ppb, because 115 ppb is less than 125 ppb). The following equation was used for calculating this metric:

$$\text{Sum}_{\text{Grid Cells}} \{ \text{Sum}_{\text{Days}} [(O_3)_{\text{BASE}} - \max [(125 \text{ or } 85), (O_3)_{\text{Zero-out}}]] \}$$

As stated in the above comment, Indiana does not agree with zero-out modeling. It seems USEPA is trying to compensate for zero-out modeling error by not including values below 125 ppb or 85 ppb. In the above example, the 1-hour daily maximum ozone prediction is 150 ppb and the corresponding value from the zero-out run is 115ppb, then the difference between these two numbers is 35 ppb. USEPA is saying the answer is 25 ppb and ignores the extra 10 ppb. This equation implies the zero-out modeling is not accurate and this equation tries to compensate for it. In the UAM-V metrics, Indiana is considered a Group 2 Upwind State and has been estimated to contribute 2 to 5 ppb which USEPA feels is significant. USEPA contradicts themselves when they say 2 to 5 ppb is significant when 10 ppb is not. Indiana feels the problem of zero-out modeling is inaccurate and is further demonstrated by compensating for it in this UAM-V metric equation.

Recommended Modeled Attainment Test

The recommended modeled attainment test uses monitored design values in conjunction with model generated data. The test uses model results in a “relative rather than “absolute” sense. This process helps reduce the “uncertainty” in the model predictions. “Uncertainty” is the premise that model estimates will not perfectly predict observed air quality at each receptor location, either now or in the future. Since this is the case, USEPA recommends using models in a relative sense in concert with observed air quality data.

It is not evident that this process was followed to show attainment in the Section 126 petition process. The Weight of Evidence USEPA used for culpability was not tied to how that impacted the attainment of the ozone standard. Indiana feels that USEPA should follow their own guidance for attainment demonstrations.

Modeling/Analysis Protocol

A modeling/analysis protocol is a document that identifies methods and procedures to be used in the analyses. The protocol also identifies ground rules to be followed in undertaking analyses to estimate emission reductions needed to meet air quality standards. Ground rules include a description of how affected stakeholders in the modeling/analysis process will be encouraged to participate, the process by which decisions will be made, means used for communicating issues and decisions, and the methods, data bases and procedures to be used to obtain results.

In the OTAG process, there was considerable stakeholder involvement in the analyses but in NOx SIP call this process was not followed by USEPA. Decisions were made without involvement of all affected parties. USEPA should follow this process to involve all stakeholders in the technical work that supports the Section 126 petitions.

Documentation of Stakeholder Involvement

USEPA recommends that stakeholder involvement be documented showing the names of the stakeholders participating in preparing and implementing the protocol. There is no documentation showing this ever happened. Indiana recommends USEPA provide this documentation in its analysis.

Documentation of Review Procedures Used

USEPA recommends that the attainment demonstration reflect sound practice by assuring that methods used for the analysis were peer reviewed by outside experts.

No documentation was provided to indicate that this occurred. USEPA needs to follow this process plus provide documentation stating how this was carried out.

Data Access

Data must be available to interested parties to replicate model performance and attainment simulation results.

USEPA needs to provide easily accessible and understandable technical procedures for accessing input and output files. The agency should also provide documentation on what computer system the files were generated and how they can be read. Identification of the specific contact person for downloading the files and the administrative procedures to access the files needs to be provided. Adequate technical support should be provided to answer questions on all technical support data.

Episode Selection

Based on the attainment demonstration guidance, there are three primary criteria that should be considered in choosing episodes to model for supporting ozone attainment demonstrations. One of the primary criteria is that episodes should contain days with observed 8-hour daily maximum ozone concentrations close to (± 10 ppb) site-specific design values monitored during the 3-year period straddling the episode.

Based on the current documentation, it is not clear whether these criteria were followed for episode selection. USEPA should provide documentation regarding episode selection.

Inventory Incompleteness

The amount of emissions reduction in the modeled strategy (NOx SIP Call) is not identical to the amount of emissions reduction in the Section 126 petitions. This is due to differences in (a) the underlying emissions inventories and (b) the level of emissions controls applied to individual sources. For the Section 126 petitions, USEPA used the average of the two highest control periods for the years 1995, 1996, and 1997, while for the SIP Call USEPA used the highest aggregated state heat input of 1995 or 1996. Another difference in inventories is the size of electric generating units. Therefore, Indiana's modeling comments focus on the modeling performed in the NOx SIP call. The petitions filed by New York, Connecticut, and Pennsylvania used 15 MWe as the size cutoff, whereas USEPA's inventory in the SIP call used 25 MWe.. Also, the Section 126 petitions did not include all sources in the SIP. Will this result in insufficient reductions or limit flexibility in trading enough to affect the cost effectiveness of reductions causing "significant impact"? None of the programs line up exactly. The NOx SIP call is by far the most well-constructed and provides the states some opportunity to tune for their particular situations.

USEPA did not perform any additional modeling to determine if the differences in the inventories would be significant. Indiana feels some form of modeling sensitivity analysis should be performed to determine whether this difference in inventories is significant or redo the modeling with a revised inventory.

ATTACHMENTS